



Assessing revenue collection strategies in the commercialised water utility companies in Zambia; A case of Chambishi, Luapula and western utility companies

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Abstract

The subject of service quality has been studied and debated over the past two decades, and is an evolving term as to what constitutes quality. It is evident that today's customers are highly enlightened and aware of their importance that ignoring them in search for competitive advantage can be detrimental to service providers. The study objective was to assess strategies for maximising revenue collection in the commercialised utility companies; a case of Chambishi, Luapula and Western Water and Sanitation Companies in Zambia. It focused on a sample size of 75 respondents from the three (3) water utility companies randomly selected out of the available 11 companies in Zambia. The study used a mixed method (both qualitative & quantitative) as well as exploratory descriptive research methodology. Questionnaires were issued to participants and interviews to selected individuals was conducted to obtain primary data for analysis. The findings were that all the three (3) existing methods of revenue collection continued being used simultaneously depending on customer preference. While factors hindering effective revenue collection were identified as low customer income levels, unreliable online payment platforms, and incorrect billing among others. Strategies to improve revenue collections includes; go 100% prepaid, prompt disconnection of water supply for outstanding bill beyond 30 days, customer relations to address the issue of disputed bills, illegal connections and lack of sensitization, and improve on maintenance to reduce loss of water through leakages was to improve revenue collections. The study recommends that utility companies should continue using all methods of revenue collection, while discontinuing discounting bills for customers who pay promptly on time, discontinue debt factoring and discontinue fixed charge billing.

Keywords: revenue management, commercialization, revenue collection strategies

Introduction

The aims of commercialization in the water sector are cost recovery and improved access to water (Mc Donald, 2002). Apart from organizational changes (the creation of commercial utilities and their separation from the municipal authorities, introduction of regulatory mechanisms, etc.), under the new framework suppliers are required to improve their billing and revenue collection rates, reduce overstaffing and rationalize tariffs in an effort to achieve full cost recovery. In practice, in low-income countries enduring a prolonged period of economic austerity, the commercialization of water services has been an instrument for governments to relinquish their responsibility for funding investments in network expansion. While, in general, water sector reforms for improving efficiency, service quality and access are welcome, heavy reliance on tariff rationalization without paying much attention to investment and maintenance needs could be a serious problem (Dagdeviren, 2008).

A water sector crisis in Africa followed the recessionary conditions of the 1970s, when many suppliers found themselves in a financial vicious circle caused by a decline in government funding of capital expenditure, low tariffs, low billing, low revenue collections and increasing demand for water. However, the experiments of more than a decade have shown that privatization of water services was a poor policy prescription, involving 'spectacular failures' in the words of UNDP (2006: 92). Problems have been associated with the difficulty of establishing competitive market structures (Estache *et al.*, 2005; Kessides, 2004; Kirkpatrick *et al.*, 2006), ineffectiveness of regulation in the presence of information asymmetries and incomplete contracts

(Martimort, 2006), and negative welfare effects (Bayliss, 2003; Dagdeviren, 2006; Ugaz and Price, 2003). Over the years, the confidence of the public in the benefits of utility privatization and that of the private sector in the profitability of developing country utilities, especially water, have dwindled. Private investment in infrastructure projects has declined and many existing private operations have been subject to re-negotiation (Hall and Lobina, 2004; Harris, 2003). In many low-income economies, investment needs in the water sector are colossal and the affordability of rising water tariffs is usually a problem. Hence, neither full privatization, nor public-private partnerships which do not involve substantial transfers from the public sector, are attractive for the multinational investors who dominate the water sector (Kirkpatrick and Parker, 2006; Lobina, 2005). As a result, the commercialization of services under public corporations has become the *de facto* policy in many countries such as Zambia. Indeed, current trends in the low-income economies are increasingly being determined by corporatization of existing public suppliers and commercialization of services (Estache *et al.*, 2005; Prasad, 2006; Smith, 2006). This is sometimes used as an intermediate step before further privatization, as in the case of water supply and Sanitation in Zambia.

The characteristics of Zambia and its water sector in many ways typify those of other low-income economies with, for example, high levels of poverty, limited access to water and crumbling water network in the urban Centre's. Hence, its experience with commercialization and the lessons associated with it should be highly relevant elsewhere.

Prior to the 1990s, municipal authorities were responsible for the operation and delivery of urban water supply and

sanitation services. The infrastructure was owned, maintained and extended by the central government. A different arrangement existed in the Copperbelt where Zambia Consolidated Copper Mines owned and operated the water network and supplied water to the mines, its employees and other residents in the mine townships. Water tariffs in all the urban Centers of Zambia were heavily subsidized. Charges were paid as part of rents and were mostly unnoticed by users.

Privatization, although permitted by the 1997 National Water Policy, did not feature in the process of restructuring water services; except for a management contract awarded in the mining towns of the Copperbelt, the most financially viable service area. The implementation of the contract was only possible with a World Bank loan to the government to cover various expenses, including management fees and network rehabilitation. Even then, the contract was terminated in 2005 on the grounds that the privatized management did not perform any better than publicly owned utilities. The service responsibility was transferred to another public utility in the province, Nkana WSC.

One of the positive developments in the sector since the inception of the reforms is the role played by the regulatory body, NWASCO (World Bank, 2004). More information is now publicly available about the operation and performance of commercial WSCs than about municipal providers and water schemes developed by the NGOs, which were not subject to independent regulation until 2005. Since then, NGO schemes are also covered in the regulator's annual reports, which detail companies' progress in performance and identify their weaknesses. These annual reports seem to have fostered 'yardstick competition' and brought some dynamism into the sector. The availability of information on comparative performance seems to be forcing companies to take remedial actions and to improve their service delivery. Audit reports had often cited failure to Maximise Revenue Collection. The general business problem is that the inefficient collection of revenue from water fees has negatively influenced business liquidity and profitability of these public water utilities. This in a layman's sense means that these utility companies will not manage to foot the bill for provision of water to the customer's satisfaction. The utility companies were much more challenged to mend broken water pipes affecting the pressure in taps at homes; monitoring the quality of water at the end users point in particular looking at chlorine levels at points of use. This affected the customer negatively in one sense as well as it impeded the quality of service being provided and the disadvantage this income challenge has on the employees to these companies. OAG, (2018) report indicates that commercialized water supply and sanitation companies in Zambia continue to report high revenue but poor working capital ratios, such as current, acid test and debtor's day ratios, an indication that collection of revenue from the customer has been the major challenge

Besides the urgent need for remedial action, Managers of public water utilities in Africa have difficulties in efficiently collecting water bills from their customers (Chitonge, 2013). Billing and revenue collection are the two factors that drive cash flows of water utilities because billing and revenue collection involve collection costs, billing costs, and bad debts. Inefficient methods of collecting revenue negatively affect the profitability of businesses (Rao & Apparao, 2014). In Malawi for example, Leaders of water utilities fail to

collect revenue from 18% of their customers (World Bank, 2013).

The National Water and Sanitation Council (NWASCO) in the 2020 Sector Reported that, the year was not an easy one for both the sector and the country at large. This was largely attributed to the COVID 19 pandemic which had devastating effects on the water supply and sanitation sector. The pandemic is which is a hygiene-centered disease, with the need to manage the spread of the pandemic bordered on the availability of water which is clean and safe for washing hands.

The Commercial Utilities (CUs) ability of the to provide clean and safe water was however, largely frustrated by the failure by customers to pay water bills especially in the early phases of the COVID 19 pandemic.

Despite the pandemic, the Sector reported positives in revenue collected, this attributed to Government liquidation of arrears owed to Commercial Utilities (CU's). Appendix 1 attached to this report shows the overview performance of the Water and Sanitation Sector which overly did not perform very well. For instance, Non-Revenue Water (NRW) has a benchmark of 25%, the report shows that the average across the eleven (11) C U's was 52.8 % twice the benchmark which ranged between 35 % for Chambeshi Water Supply and Sanitation Company (CHWSC), to as high as 74 % for Luapula Water Supply and Sanitation Company (LPWSC).

Amidst stiff competition in the water service provision, commercial water utility companies have continued to face challenges including High non-revenue water, high energy expenses, Debt accumulation, growing population against their financial muscle thus rendered unable to meet the demand, and increase in chemical prices due to depreciation of kwacha to mention but a few. These challenges if left unchecked poses a danger to the success of the commercialization process of water supply in the country. This also has a direct bearing on the part of its customers as they may end up being supplied water intermittently, low pressure and without chlorine residue. This is one of the reasons that have pushed customers to sink boreholes in their premises, an act which further affects the success in the commercialization process.

Literature reviewed regarding the dimensionality of revenue collection strategies that are appropriate for each service area hardly exist providing a knowledge and makes this population gap as Zambia remains underserved.

Methods

The study is a mixed methods study using both qualitative & quantitative research with exploratory descriptive approach as a research methodology. The researcher conducted unstructured interviews with (75) employees from headquarters and district offices of three Water Supply and Sanitation companies to explore the most important influential factors on revenue collection from the point of view of the organizational members.

Data Collection

This study used structured and unstructured interviews and questionnaire to gather data and explored the factors influencing the revenue collection.

The Sample

It was proposed that data be collected from three Commercial Utilities namely; Chambeshi, Luapula and Western Water

Supply and Sanitation Companies Limited There are Eleven (11) Commercial Utility companies in Zambia, the nature of the operations across the utility companies are homogeneous therefore, the findings in the three companies picked for the research can be generalized across all the eleven (11) in the country. This study employed a non-probability sample strategy and a purposive sampling method to select respondents who were believed to be the most reliable for the research from Administration, Commercial and Finance Departments of the participating Commercial Utilities.

The Taro Yamane formula seen below was used to calculate the sample size (Taro, 1967, p. 886)

$$n = \frac{92}{(1+N)(0.05)^2}$$

$$n = \frac{92}{1.23}$$

$$n = 74.8$$

Therefore, the sample size was 75 participants.

Data Analysis

The statistical analysis was carried out with the Statistical Package for Social Sciences program, (SPSS, version 23). Demographic information was collected and summarized. Qualitative content analysis of the data was done manually, that is no qualitative analysis software was used in the process.

Ethical and Cultural Consideration

This research was conducted after ethical approval from the University of Zambia, Humanities and Social Sciences Research Committee (HSSREC).

In the light of the covid-19, the researcher ensured to not expose any of the respondents to the deadly virus. This was achieved through limiting of contact with participants (social distancing), avoiding crowding the research participants during focused group discussions and interviews by conducting such only in rooms big enough and restrict numbers to 5 participants per focus group discussion and only two per interview. The researcher provided masks and ensured appropriate use during the interaction with participants who also performed hand hygiene through hand sanitizing and washing of hands. The zoom meeting app was used for interviews and focus group discussion to limit contact with participant. Due to ethical issues, consent was sought prior to such online meetings and the meeting was not be recorded.

The three ethical principles which include: The principle of beneficence, respect for human dignity and principle of justice was put in consideration during the course of data collection.

Results

Revenue Collection Methods

The table 4.2.1 below shows the revenue collection methods that are used by the utility companies. The table shows that 55 respondents representing 73.3% of the respondents from utility companies indicated that online payment platforms, sales office and revenue collectors were used to collect revenue. The table also shows that 3 respondents representing 4% of the respondents indicated that their utility company revenue is collected by revenue collectors.

Table 4.2.1: revenue collection methods

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|--------------------------|-----------|---------|---------------|--------------------|
| Revenue Collectors | 3 | 4.0 | 4.0 | 4.0 |
| Sales Office | 13 | 17.3 | 17.3 | 21.3 |
| Online Payment Platforms | 4 | 5.3 | 5.3 | 26.7 |
| All of the Above | 55 | 73.3 | 73.3 | 100.0 |
| Total | 75 | 100.0 | 100.0 | |

Strategies to Optimize Revenue Collection

1. Go 100% prepaid- invest in ICT to migrate from postpaid to prepaid

The table 4.4.1 below shows whether revenue collection can be improved by going 100% prepaid and investing in ICT to migrate from postpaid to prepaid. From the table, it can be seen that 45 respondents representing 60% of the respondents think that going 100% prepaid and migrating from prepaid to postpaid can optimize the utility companies' revenue collection measures while 30 respondents representing 40% of the respondents believe that migrating from prepaid to post cannot improve the utility company revenue collection.

Table 4.4.1: Go 100% Prepaid-Invest in ICT to Migrate from Postpaid to Prepaid

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-----------|---------|---------------|--------------------|
| NO | 30 | 40.0 | 40.0 | 40.0 |
| YES | 45 | 60.0 | 60.0 | 100.0 |
| Total | 75 | 100.0 | 100.0 | |

1. Prompt disconnection of water supply for outstanding bill beyond 30 days

The Table 4.4.2 below shows whether revenue collection can be improved by prompt disconnection of water supply for outstanding bill beyond 30 days. From the table, it can be

seen that 46 respondents representing 61.3% of the respondents think that prompt disconnection of water supply for outstanding bill beyond 30 days can optimize the utility companies' revenue collection measures while 28 respondents representing 37.3% of the respondents believe that migrating from prepaid to postpaid can not improve the utility company revenue collection.

Table 4.4.2: Prompt Disconnection of Water Supply for Outstanding Bill Beyond 30 Days

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|----------------|-----------|---------|---------------|--------------------|
| NO | 28 | 37.3 | 37.8 | 37.8 |
| YES | 46 | 61.3 | 62.2 | 100.0 |
| Total | 74 | 98.7 | 100.0 | |
| Missing System | 1 | 1.3 | | |
| Total | 75 | 100.0 | | |

Customer relations to address the issue of disputed bills, illegal connections and lack of sensitization

The Table 4.4.3 below shows whether revenue collection can be improved by customer relations to address the issue of disputed bills, illegal connections and lack of sensitization. From the table, it can be seen that 44 respondents representing 58.7% of the respondents think that having

customer relations address the issue of disputed bills, illegal connections and lack of sensitization can optimize the utility companies’ revenue collection measures while 31 respondents representing 41.3% of the respondents believe that having customer relations to address the issue of disputed bills, illegal connections and lack of sensitization cannot improve the utility company revenue collection.

Table 4.4.3: Customer Relations to Address the Issue of Disputed Bills & Illegal Connections

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-----------|---------|---------------|--------------------|
| NO | 31 | 41.3 | 41.3 | 41.3 |
| YES | 44 | 58.7 | 58.7 | 100.0 |
| Total | 75 | 100.0 | 100.0 | |

Discounted Bills for Customers who Pay Promptly on Time

The table 4.4.4 below shows whether revenue collection can be improved by discounting bills for customers who pay promptly on time. From the table it can be seen that 14 respondents representing 18.7% of the respondents think that discounting bills for customers who pay promptly on time can optimize the utility companies’ revenue collection measures while 61 respondents representing 81.3% of the respondents think that discounting bills for customers who pay promptly on time cannot improve the utility company revenue collection.

Table 4.4.4: Discounted Bills for Customers Who Pay Promptly on Time

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-----------|---------|---------------|--------------------|
| NO | 61 | 81.3 | 81.3 | 81.3 |
| YES | 14 | 18.7 | 18.7 | 100.0 |
| Total | 75 | 100.0 | 100.0 | |

Debt Factoring

The table 4.4.5 below shows whether revenue collection can be improved by debt factoring. From the table it can be seen that 19 respondents representing 25.3% of the respondents think that debt factoring can optimize the utility companies’ revenue collection measures while 56 respondents representing 74.7% of the respondents believe that debt factoring cannot improve the utility company revenue collection

Table 4.4.5: Debt Factoring

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-----------|---------|---------------|--------------------|
| NO | 56 | 74.7 | 74.7 | 74.7 |
| YES | 19 | 25.3 | 25.3 | 100.0 |
| Total | 75 | 100.0 | 100.0 | |

Completely Remove Fixed Charge Billing

The table 4.4.6 below shows whether revenue collection can be improved by completely removing fixed charged billing. From the table, it can be seen that 25 respondents representing 33.3% of the respondents think that completely removing fixed charge billing can optimize the utility companies’ revenue collection measures while 50 respondents representing 66.7% of the respondents believe that completely removing fixed charge billing cannot improve the utility company revenue collection.

Table 4.4.6: completely remove fixed charge billing

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-----------|---------|---------------|--------------------|
| NO | 50 | 66.7 | 66.7 | 66.7 |
| YES | 25 | 33.3 | 33.3 | 100.0 |
| Total | 75 | 100.0 | 100.0 | |

Improve on Maintenance to Reduce Loss of Water Through Leakages

The table 4.4.7 below shows whether revenue collection can be improved by improving on maintenance to reduce loss of water through leakages. From the table it can be seen that 52 respondents representing 69.3% of the respondents think that improving on maintenance to reduce loss of water through leakages can optimize the utility companies’ revenue collection measures while 23 respondents representing 30.7% of the respondents believe that improving on maintenance to reduce loss of water through leakages cannot improve the utility company revenue collection.

Table 4.4.7: Improve on Maintenance to Reduce Loss of Water Through Leakages

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|-----------|---------|---------------|--------------------|
| NO | 23 | 30.7 | 30.7 | 30.7 |
| YES | 52 | 69.3 | 69.3 | 100.0 |
| Total | 75 | 100.0 | 100.0 | |

Discussion of findings

The study was undertaken so as to Assess Strategies for Maximising Revenue Collection in the Commercialised Utility Companies in Zambia; A Case Study of Chambeshi, Luapula and Western Water Supply and Sanitation Companies.

Revenue Collection Methods

The question of the development of an optimal revenue collection method used by the utility companies revealed that all methods of revenue collection available accounted for 55 respondents which was 73.3% of the sample from all the utility company’s revenue i.e. online payment platforms, sales office and revenue collectors to collect revenue. However, individually the current methods are not effective as it revealed that only 3 respondents representing 4% of the respondents thought that utility company’s revenue should be collected by revenue collectors, and 13 respondents representing 17.3% indicated that revenue should be collected by the sales office whereas 4 respondents representing 5.3% indicated that the utilities should collect their revenue through online payment platforms. Similarly, Karimi, at al., (2017) in their study titled “effect of technology and information systems on revenue collection by the county government of Embu, Kenya” found that computerized Information Systems had a positive effect on revenue collection. Computerization of council activities such as revenue collection enhanced efficiency as a result of timely revenue collection, enhancing management integrity, provision of clear records among other factors. Information systems also improved the operations that are facilitated by the Internal Control Systems which in turn enhances efficiency and effectiveness of the council.

On the contrary in another study in Uganda by Atuheire, (2019) where he investigated the effect of electronic payment systems on revenue collection of water utilities; a case the national water and sewerage corporation (NWSC) - Kabale

Branch. The corporation initially operated cash offices at every branch and had to employ personnel to collect money from water users. This increased operational costs, increased default rates and reduced revenue collection efficiency (NWSC Annual Report, 2020). In efforts to surmount these challenges, the corporation embarked on plans to phase out cash offices and relinquish non-core services, for example relinquishing the collection of bills to institutions that have the facilities to manage those services. This was meant to reduce on costs associated with physical collection and increase revenue collection efficiency and reduce the inconveniences of payment for its customers (Ndaw & Mutono, 2015). According to Ndaw & Mutono (2015), adoption of electronic water payment system has helped NWSC to collect payments from 98% of its current customer base. This was because customers had more payment options and points since the participating banks and telecom companies had more branches than the utility countrywide. Despite introduction of the e-payment system, the corporation continued to face shortfalls in its revenue collections characterized by accumulated arrears and unpaid bills (NWSC Annual Report, 2020). The recent report has revealed a sharp drop in revenue collection of the corporation in 2020 when billed revenue dropped by 78% and collection was as low as 28% (Danilenko, 2020).

In conclusion, for Kertous and Zerzour (2020) the problem of bill collection is, in the case of the province of Bejaia, Algeria partly due to socio-economic constraints, but it is also the result of local management practices that create dissatisfaction among customers. This finding was confirmed by the commercial director of the ADE. According to him most of the delays and uncovered bills are due to discontent subscribers regarding the service provided by the ADE (water shortages, water quality, etc.) In this way, in order to find a solution to this situation, the company must make efforts to improve the quality of service offered.

Similarly, Mukuwa and Phiri (2020) found a significant relationship between electronic services on revenue collection on tax compliance among small and medium enterprises in Zambia. Significant relationships were observed amongst performance expectancy, effort expectancy, and social influence predictors to use e-services. Just like other organizations that provide utility services, NWSC has registered a steady change in her revenue collection as a response from the introduction of electronic payment methods. The strong relationship between electronic payment methods and revenue collection in NWSC borrow support from previous research studies that have found strong relationships (Ejiku, 2019; Fatonah, Yulandari, & Wibowo, 2018; Kamana, 2016). Moreover, this study established that electronic payments have significant associations with revenue collection in NWSC.

Strategies to optimize revenue collection

1. Go 100% prepaid- invest in ICT to migrate from postpaid to prepaid

The question whether revenue collection can be improved by going 100% prepaid and investing in ICT to migrate from postpaid to prepaid. It can be seen that 45 respondents representing 60% of the respondents thought that going 100% prepaid and migrating from postpaid to prepaid can optimize the utility companies' revenue collection measures while 30

respondents representing 40% of the respondents believe that migrating from postpaid to prepaid will not improve the utility company revenue collection.

From the responses it can be deduced that Go 100% prepaid-invest in ICT to migrate from postpaid to prepaid can optimize the utility companies' revenue collection measures. Similarly, Karimi, et al., (2017) in their study titled "effect of technology and information systems on revenue collection by the county government of Embu, Kenya" found that computerized Information Systems had a positive effect on revenue collection. Computerization of council activities such as revenue collection enhanced efficiency as a result of timely revenue collection, enhancing management integrity, provision of clear records among other factors. Information systems also improved the operations that are facilitated by the Internal Control Systems which in turn enhances efficiency and effectiveness of the council.

Similarly, Mukuwa and Phiri (2020) found a significant relationship between electronic services on revenue collection on tax compliance among small and medium enterprises in Zambia. The strong relationship between electronic payment methods and revenue collection in NWSC borrow support from previous research studies that have found strong relationships (Ejiku, 2019; Fatonah, Yulandari, & Wibowo, 2018; Kamana, 2016). Moreover, this study established that electronic payments have significant associations with revenue collection in NWSC.

2. Prompt disconnection of water supply for outstanding bill beyond 30 days

The question whether revenue collection can be improved by prompt disconnection of water supply for outstanding bills beyond 30 days. It can be seen that 46 respondents representing 61.3% of the respondents thought that prompt disconnection of water supply for outstanding bills beyond 30 days can optimize the utility companies' revenue collection measures while 28 respondents representing 37.3% of the respondents believe that migrating from postpaid to prepaid cannot improve the utility company revenue collection.

From the responses it can be deduced that prompt disconnection of water supply for outstanding bills beyond 30 days can optimize the utility companies' revenue collection measures. Metering errors and water theft are the main sources of commercial losses, while fire hydrants for firefighting as well as new connections and reconnections which had not been assigned service, due to lack of meters or negligence on the part of the company personnel, are the main sources of unbilled authorized consumption. The recommended management practices by the International Water Association to augment the overall 'nonrevenue water strategy' are not wholly being implemented because of the poor state of infrastructure which seems to impede the efforts aimed at reducing NRW. To this effect, there's an urgent need to undertake a complete overhaul of the existing network in stages starting with the most problematic ones.

2.1 Customer relations to address the issue of disputed bills, illegal connections and lack of sensitization

The question whether revenue collection can be improved by customer relations to address the issue of disputed bills, illegal connections and lack of sensitization. It can be seen that 44 respondents representing 58.7% of the respondents thought that having customer relations address the issue of

disputed bills, illegal connections and lack of sensitization can optimize the utility companies' revenue collection measures while 31 respondents representing 41.3% of the respondents believed that having customer relations to address the issue of disputed bills, illegal connections and lack of sensitization cannot improve the utility company revenue collection.

Similarly, the 13th edition of the urban and peri urban water supply and sanitation sector reports (2014) came with many recommendations including, addressing illegal connections and non-metering of none revenue water, the need to expedite complaint handling and resolution. These complaints ranged from erratic supply, leakages and non-availability of the service they pay for. Further, UN HABITAT, (2008), Illegal connection control is the proactive, effective and comprehensive identification and investigation of illegal water consumers in the water supply areas.

2.2 Discounted bills for customers who pay promptly on time

The question whether revenue collection can be improved by discounting bills for customers who pay promptly on time. It can be seen that 14 respondents representing 18.7% of the respondents thought that discounting bills for customers who pay promptly on time can optimize the utility companies' revenue collection measures while 61 respondents representing 81.3% of the respondents thought that discounting bills for customers who pay promptly on time cannot improve the utility company revenue collection.

From the responses it can be deduced that discounted bills for customers who pay promptly on time cannot optimize the utility companies' revenue collection measures.

2.3 Debt factoring

The question whether revenue collection can be improved by debt factoring. It can be seen that 19 respondents representing 25.3% of the respondents thought that debt factoring can optimize the utility companies' revenue collection measures while 56 respondents representing 74.7% of the respondents believed that debt factoring cannot improve the utility company revenue collection.

From the responses it can be deduced that debt factoring cannot optimize the utility companies' revenue collection measures.

2.4 Completely remove fixed charge billing

The question whether revenue collection can be improved by completely removing fixed charge billing. It can be seen that 25 respondents representing 33.3% of the respondents thought that completely removing fixed charge billing can optimize the utility companies' revenue collection measures while 50 respondents representing 66.7% of the respondents believed that completely removing fixed charge billing cannot improve the utility company revenue collection.

Billing processes play a critical role in revenue for a number of public sector organizations, including municipalities. In the delivery of public services, for example, billing drives cash flow and is the key source of information for customers using these services. This study shows that in many countries, reforming billing processes, coupled with strengthening collection processes, has improved revenue collection. Most of the evidence about the role of billing in revenue collection comes from the water sector. Some experts argue that billing systems based on consumption are more likely to be paid by

individual users. In the water sector, this could take the form of universal adoption of water metering or spot-billing. Other measures to improve revenue collection include computerizing customer databases and billing systems. Eliminating human handling from all billing processes has been seen to prevent fraud and billing errors, and some advocate pre-payment as a means of increasing collections. A number of case studies illustrate the improvement of revenues through better billing and collection processes; most of these are from the water sector. The case studies presented in this helpdesk report are from Bangladesh, Brazil, Burkina Faso, India, Kenya, Philippines, Rwanda, Senegal, Thailand and Uganda.

2.5 Improve on maintenance to reduce loss of water through leakages

The table below shows whether revenue collection can be improved by improving on maintenance to reduce loss of water through leakages. It can be seen that respondents representing 52 respondents representing 69.3% of the respondents thought that improving on maintenance to reduce loss of water through leakages can optimize the utility companies' revenue collection measures while 20 respondents representing 30.7% of the respondents believed that improving on maintenance to reduce loss of water through leakages cannot improve the utility company revenue collection.

Reducing water loss from water supply systems is often regarded as one of the most important ways to improve the resource efficiency of water supply services. However, the costs and impacts of water loss reduction efforts need to be weighed against the benefits to define the optimal water loss target level. To this end, Ahopelto and Vahala, (2020) conducted a cost-benefit analysis of three investment-based leakage reduction methods: district metering, pressure reduction, and pipe renovations. Furthermore, they conducted uncertainty and sensitivity analysis to determine the most relevant data for leakage analysis and policymaking on a national level. The results indicate the contrary to the current study as they show that water loss management might not be directly cost-beneficial to utilities operating with moderate leakage levels.

Conclusions

There were three methods of revenue collection and those were still supported by the respondents as being valid collection methods. It was observed that low customer income levels, unreliable online payment platforms, and incorrect billing led to disputes which led to reluctance to pay leading to ineffective revenue collection. While high tariffs, existence of alternative sources of water, inadequate revenue collectors, complicated online payment platforms, inadequate payment points, lack of sensitization on the need to pay bills and illegal connections which were not metered did not hinder revenue collection. On strategies to increase revenue collections measures such as; Go 100% prepaid-invest in ICT to migrate from postpaid to prepaid, Prompt disconnection of water supply for outstanding bill beyond 30 days, Customer relations to address the issue of disputed bills, illegal connections and lack of sensitization, and Improve on maintenance to reduce loss of water through leakages helped improve revenue collection. While issues of discounted bills for customers who pay promptly on time, debt factoring and completely removing fixed charge billing did not help to optimize revenue collection in the water utility companies under study.

Recommendations

The study recommends that utility companies consider doing the following;

On objective one: Existing Revenue Collection Strategies

- Continue using all methods of revenue collection as they are handling a clientele of different socioeconomic and educations levels

On objective two;

They should improve on customer levels

- Improve on the reliability of online payment platforms
- Improve billing systems

On objective three;

- Discontinue discounting bills for customers who pay promptly on time
- Discontinue debt factoring and;
- Discontinue fixed charge billing

Proposal for a future topic

- Conducting the same study in all the 11 Utility Companies in Zambia.

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